



# The Prevention of Cancer

Edited by Michael Alderson MD, FFCM

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## Preface

All the authors of this book were on the scientific staff of the Division of Epidemiology, Institute of Cancer Research, London when it was planned and written. The four authors combine a range of disciplines; they have worked in a wide variety of different fields, including (a) varying numbers of years on research, including into the aetiology of cancer, and (b) involvement with the practical issues of cancer control.

The book describes the extent of the cancer problem, presents information on the causes of cancer, and provides a critical assessment of the steps that may be taken to reduce the toll from this disease. The emphasis is upon steps which may be pursued now, on the basis of presently available evidence. Many of the issues involved are complex and where no realistic control programme can be advocated the research required as a basis for future action is indicated.

The intention was that the book should be of interest to: those involved in cancer control as health administrators and planners, health educators, epidemiologists, academic social scientists involved in research and teaching on Social Sciences in Medicine, and clinicians (particularly those interested in early detection of cancer). Though written by four UK authors, the text should be of equal interest in other countries—though the extent of the cancer problem and the causes differ.

The authors would like to thank their colleagues for discussing various points that arose in clarifying views on the prevention of cancer; particular thanks are due to members of ASH who helped with some issues of smoking. A review such as this places a heavy load on library facilities and thanks are due to Mrs Sue Dobby, librarian at the Institute of Cancer Research. It is a pleasure to acknowledge the help given, not only with typing, by our secretaries: Mrs D. Folkes, Mrs S. Skeet, Miss J. Miller, and Mrs T. Bagley.

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M. R. Alderson

# Contents

<b>Contributors</b>	<b>v</b>
<b>Preface</b>	<b>vi</b>
<b>1 Introduction</b> <i>Michael Alderson</i>	<b>1</b>
The scope of this book	1
The levels of prevention	1
<b>2 The extent of the cancer problem</b> <i>Michael Alderson</i>	<b>3</b>
England and Wales: current data	4
England and Wales: trends in deaths from neoplasms	5
Trends by site of malignancy	7
International data	14
Survival from malignancy	16
Conclusions	19
References	19
<b>3 The causes of cancer</b> <i>Michael Alderson</i>	<b>20</b>
Organization of the material on aetiology	20
Carcinogenesis: general considerations	21
Validity of data	23
Cancer of different sites	26
Specific aetiological factors	46
References	66
<b>4 Lay and professional beliefs and feelings about cancer</b> <i>Michael Calnan</i>	<b>80</b>
Lay beliefs and feelings about cancer	80
Professional beliefs and feelings about cancer	94
Conclusion	98
References	99
<b>5 A review of government policies aimed at primary prevention</b> <i>Michael Calnan</i>	<b>101</b>
Introduction	101
Cancer prevention: whose responsibility?	101
Tobacco and the United Kingdom	103
Alcohol and cancer: policies for prevention	135
The role of the government in alcohol control policies	141
Constituents of food and diet and cancer: policies for prevention	162

Medicines and cancer: policies for prevention	176
Conclusions	178
References	180
<b>6 The prevention of industrial cancer</b> <i>Joan M. Davies</i>	<b>184</b>
Introduction	184
Mechanisms of cancer prevention	188
Attitudes	201
Conclusions	207
References	207
<b>7 Non-governmental approaches to the control of cancer</b> <i>Michael Calnan</i>	<b>210</b>
Introduction	210
Non-governmental policy in smoking control	210
Non-governmental approaches to the control of heavy drinking and its associated problems	218
Conclusions	224
References	225
<b>8 Screening for early detection of cancer: general principles</b> <i>Jocelyn Chamberlain</i>	<b>227</b>
Introduction	227
Theoretical considerations	228
Practical aspects	233
Evaluation of screening for cancer	252
References	256
<b>9 Screening for cancer of various sites</b> <i>Jocelyn Chamberlain</i>	<b>259</b>
Introduction	259
Stomach cancer (ICD number 151)	259
Colorectal cancer (ICD numbers 153 and 154)	263
Lung cancer (ICD number 162)	266
Malignant melanoma of the skin (ICD number 172)	269
Breast cancer (ICD number 174)	269
Cancer of the uterine cervix (ICD number 180)	273
Choriocarcinoma (ICD number 181)	277
Cancer of the testis (ICD number 186)	278
Cancer of the bladder (ICD number 188)	279
General conclusions	279
References	281
<b>10 Delay in the diagnosis and treatment of cancer</b> <i>Michael Calnan</i>	<b>284</b>
Definitions	284
Extent of delay	285
Specific malignancy sites	288
Conclusions	290
References	291
Index	<b>292</b>

# 1

## Introduction

Michael Alderson

### **The scope of this book**

The book, as indicated by its title, deals with various ways of preventing cancer. It has embodied a review of present information on the causes of cancer and critical assessment of the steps that may be taken to reduce the toll from this disease.

A brief section follows which explains the various levels of prevention and those that specifically come within the scope of the book.

The next chapter deals briefly with the available information on the extent of the cancer problem, looking particularly at trends in mortality of cancer in England and Wales. This is followed by a review of the causes of cancer; this is only to set the scene for consideration of various steps in prevention and an extensive literature on aetiology has been compressed into a short review.

Chapter 4 discusses lay and professional beliefs and feelings about cancer; it is felt that an understanding of these is a first step in any satisfactory campaign of cancer control. The next two chapters deal with the role of central government and industry in preventing cancer. Chapter 7 covers various non-governmental approaches to cancer prevention; smoking and alcohol being selected for special treatment as examples of actual hazards.

Chapters 8 and 9 review screening, beginning with theoretical and practical aspects; evaluation of various methods is discussed. The specific methods of screening for cancer of the lung, breast, colorectum, stomach, bladder, cervix, choriocarcinoma, skin, testis and prostate are critically reviewed.

The final chapter is concerned with patient and professional delay in achieving treatment for symptomatic cancer; this indicates the steps that may be taken to reduce this to an absolute minimum.

### **The levels of prevention**

Control of any disease may be achieved by (i) primary prevention, which aims at removing the causative agent; (ii) secondary prevention, which has the general aim of improving the results from therapy, partly by early detection; or (iii) tertiary prevention, which covers the care directed at general support and alleviation of the problems associated with disease. In slightly more specific terms for cancer control, these activities imply (i) primary prevention through the avoidance of genetic transmission of cancer risk, or the removal or reduction of exposure



## 2 Introduction

of individuals to known carcinogens, or (perhaps) the use of therapy which will 'block' the action of carcinogens; (ii) secondary prevention involving the early detection of disease either through the screening of the population to detect precursor lesions (such as in-situ carcinoma of the cervix) or the detection of 'early' cancer (as with the screening for localized cancer of the breast)—rather different are the steps that may be taken to ensure that any patient with fresh signs or symptoms of cancer does not delay before seeking medical advice and, once this step has been taken, that diagnosis occurs without any delay; (iii) the issues of tertiary prevention involving quite different concepts, and solutions; an example of this is the care of the terminally ill—with the reduction in pain, discomfort and worry that can come with appropriate treatment. This subject has already been dealt with in a companion volume in this series (Saunders, 1978). Other aspects of tertiary prevention are not dealt with in this book, which is restricted to the consideration of methods of primary and secondary prevention.

The emphasis of the book is upon steps which may be pursued now, on the basis of presently available evidence. Many of the issues involved are complex and where no realistic control programme can be advocated, the research required as a basis for future action is indicated.

## Reference

- Saunders, Cicely M. (ed.) (1978). *The Management of Terminal Disease*. The Management of Malignant Disease Series, Vol. 1. Ed. by M. J. Peckham and R. L. Carter. Edward Arnold, London.

## The extent of the cancer problem

Michael Alderson

This chapter presents data for England and Wales for the latest period available and also a number of time trends for the major part of this century. These are to indicate the extent of the cancer problem and in particular whether malignancies of specific sites are becoming more or less common. Some limited data on international material are provided and also some data for England and Wales on survival from malignancy.

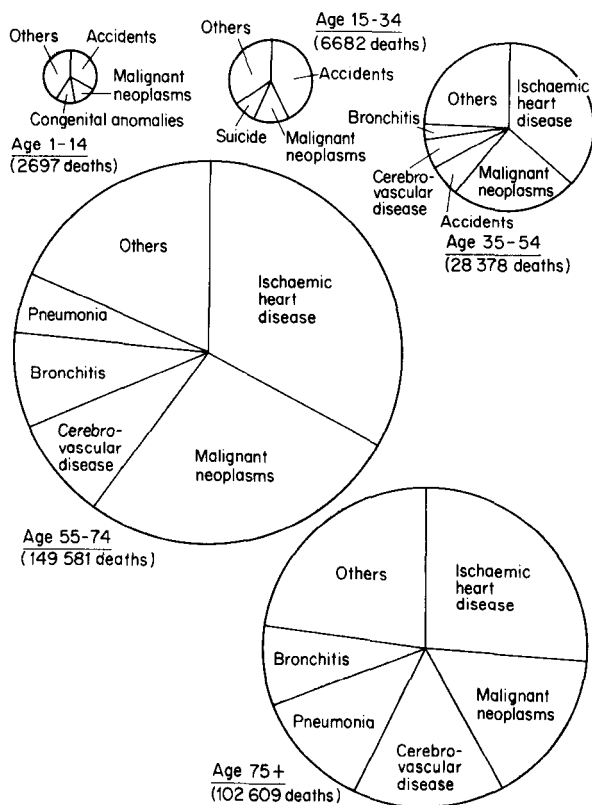


Fig. 2.1 Main causes of mortality for males at different ages in England and Wales, 1973.

England and Wales: current data

Approximately 20 per cent of the deaths in England and Wales in any year are due to malignant disease. The actual toll from malignancy varies with both age and sex. This is indicated in broad terms in Figs. 2.1 and 2.2. These show the main causes of mortality at five different ages in males and then in females in England and Wales in 1973. For males in each of the five age groups that are identified, malignant disease is the second commonest cause of death. A rather different picture is demonstrated for females; in three of the five age groups, malignant disease is the commonest cause of death (from ages 15-74). It then drops in order of importance in those aged 75 and over, becoming the fourth commonest cause of death.

Turning attention now to the specific sites of malignancy involved, Tables 2.1 and 2.2 show the numbers of deaths from different malignancies in males and females and the cumulative percentage of all malignancies site by site. Again, there are major differences between the sexes; lung cancer is the commonest cause of death in males, accounting for a horrifying 39.2 per cent of malignant neoplasm deaths. For females it is the second cause and at the moment only adds 12.8 per cent to the toll from malignancy. Because of the sex-specific malignancies being

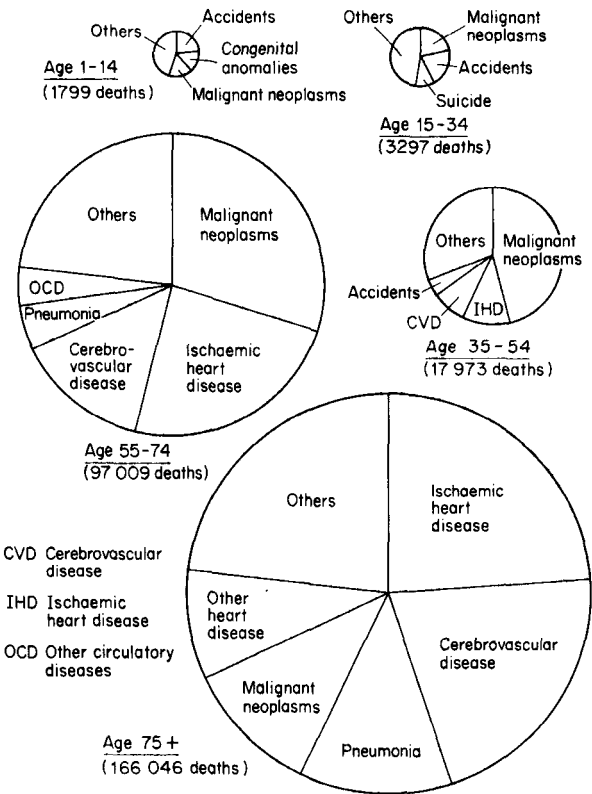


Fig. 2.2 Main causes of mortality for females at different ages in England and Wales, 1973.

**Table 2.1** Neoplasms: numbers of deaths and cumulative percentage of deaths from various sites, males (England and Wales, 1978)

<i>Site</i>	<i>Number of deaths</i>	<i>Cumulative percentage</i>
1 Lung	26 925	39.2
2 Stomach	6 698	48.9
3 Prostate	4 730	55.8
4 Large intestine	4 324	62.1
5 Rectum	3 202	66.8
6 Pancreas	3 008	71.2
7 Bladder	2 951	75.5
8 Oesophagus	2 085	78.5
9 Leukaemia	1 832	81.2
10 Brain tumours	1 761	83.7
11 Liver and gall bladder	1 318	85.6
12 Kidneys and suprarenals	1 095	87.2
13 Multiple myeloma	758	88.3
14 Larynx	649	89.3
15 Other neoplasms of lymphoid tissue	635	90.2
16 Skin excluding scrotum	605	91.1
17 Lymphosarcoma	532	91.9
18 Hodgkin's disease	398	92.4
19 Bones	395	93.0
20 Pharynx	319	93.5
21 Mouth and tonsils	272	93.9
22 Testes	233	94.2
23 Tongue	209	94.5
24 Connective and other soft tissue	202	94.8
25 Myelofibrosis	124	95.0
26 Thyroid	109	95.2
27 Small intestine	104	95.3
28 Penis	95	95.4
29 Breast	92	95.6
30 Salivary gland	89	95.7
31 Eye	76	95.8
32 Polycythaemia vera	69	95.9
33 Lip	38	96.0
34 Other (including site unspecified, benign, or nature unspecified)	2 765	100.0
All neoplasms	68 697	

relatively common in both males and females, the ordering of some of the other sites also varies between the sexes.

### England and Wales: trends in deaths from neoplasms

As a general background to consideration of the major trends, Figs. 2.3 and 2.4 show the mortality rates for males and females at three points during the present century—1911–15, 1941–45 and 1971–75. These curves are thus separated by periods of thirty years. There is a marked contrast between the figures for males and females; for the latter there is very little difference in the distribution of the curve until the very elderly. However, for the males the 1941–45 curve is higher from age 50, and higher again for the same age from 1971–75; there is a very marked increase in the rate for those over 70 years of age. (The specific site

## 6 The extent of the cancer problem

**Table 2.2** Neoplasms: numbers of deaths and cumulative percentage of deaths from various sites, females (England and Wales, 1978)

<i>Site</i>	<i>Number of deaths</i>	<i>Cumulative percentage</i>
1 Breast	11 915	20.1
2 Lung	7 606	32.9
3 Large intestine	6 057	43.1
4 Stomach	4 799	51.2
5 Ovaries and fallopian tubes	3 784	57.6
6 Rectum	2 847	62.4
7 Pancreas	2 692	66.9
8 Uterus, cervix	2 153	68.9
9 Oesophagus	1 623	73.3
10 Uterus, others	1 567	75.9
11 Leukaemia	1 540	78.5
12 Liver and gall bladder	1 327	80.8
13 Bladder	1 318	83.0
14 Brain tumours	1 312	85.2
15 Multiple myeloma	732	86.4
16 Kidneys and suprarenals	658	87.6
17 Skin	653	88.7
18 Other neoplasms of lymphoid tissue	525	89.5
19 Vulva and vagina	472	90.3
20 Lymphosarcoma	430	91.1
21 Bones	305	91.6
22 Thyroid	283	92.1
23 Hodgkin's disease	268	92.5
24 Pharynx	235	92.9
25 Larynx	189	93.2
26 Mouth and tonsils	163	93.5
27 Connective and other soft tissue	156	93.8
28 Tongue	125	94.0
29 Myelofibrosis	114	94.2
30 Small intestine	102	94.3
31 Eye	93	94.5
32 Polycythaemia vera	64	94.6
33 Salivary gland	59	94.7
34 Lip	9	94.7
35 Other (including site unspecified, benign, or nature unspecified)	3 136	100.0
All neoplasms	59 311	

responsible for this difference between the sexes is identified in subsequent graphs as lung cancer.) Another way of looking at the overall trends is to consider the percentage of all deaths at different ages that have been accounted for by neoplasm. Such data are demonstrated in the next two figures (Figs. 2.5 and 2.6). For the same calendar periods these show the percentage of all deaths by age for males and then females. Both curves show a bimodal distribution with a peak in children and a peak in the middle-aged; each shows a considerable rise in the percentage of all deaths accounted for by neoplasm. This is a reflection, not so much of an increase in neoplasms, as a decrease in other causes of death such as infectious disease. The two figures show differences, with a more pronounced rise in the proportion of deaths from malignancy in females aged 30–60. This is a reflection of the relative toll from ischaemic heart disease and breast cancer in the two sexes.

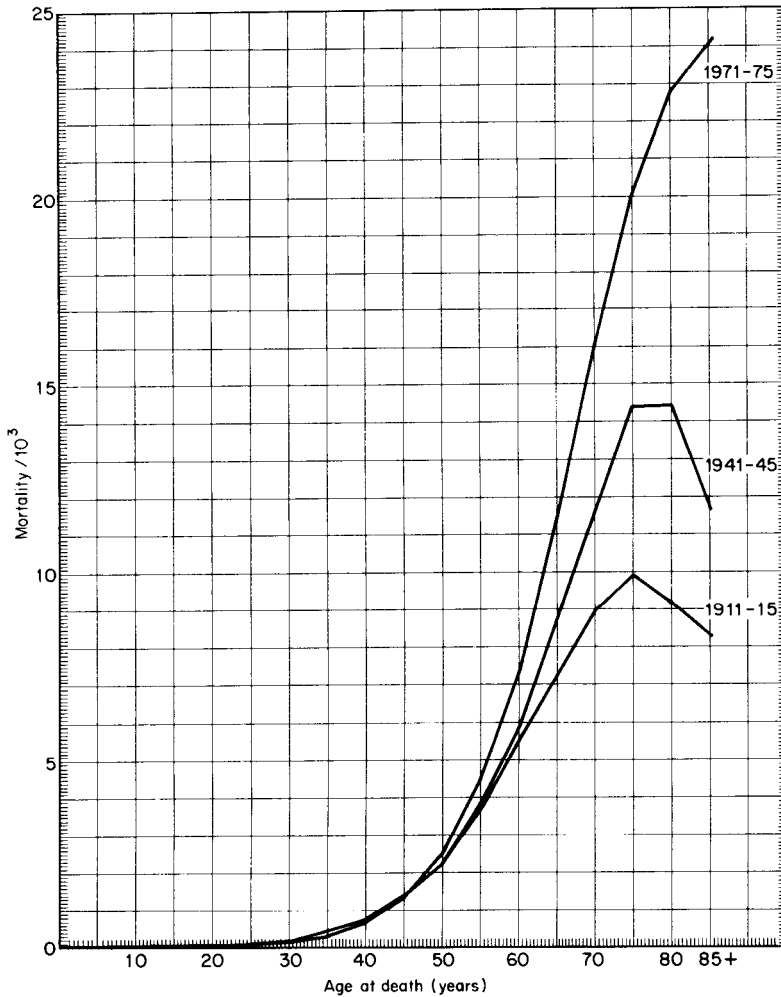
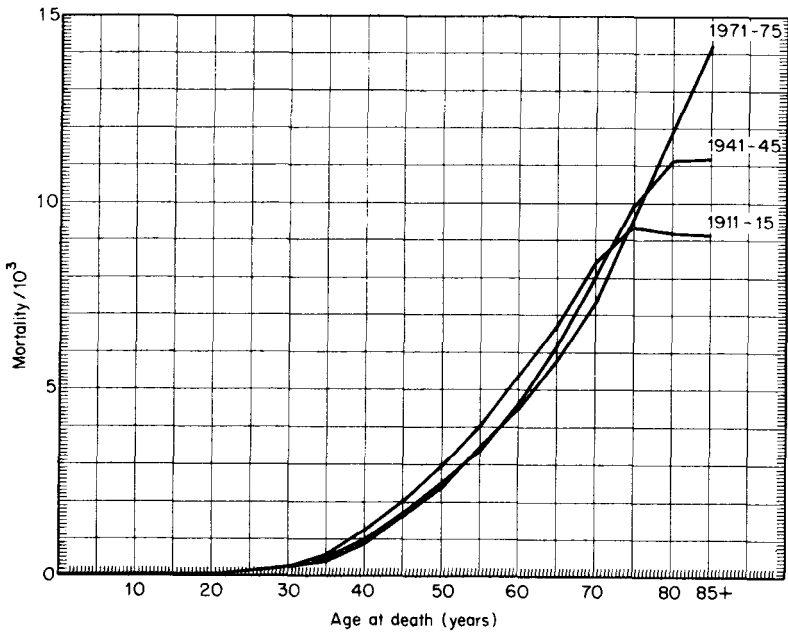


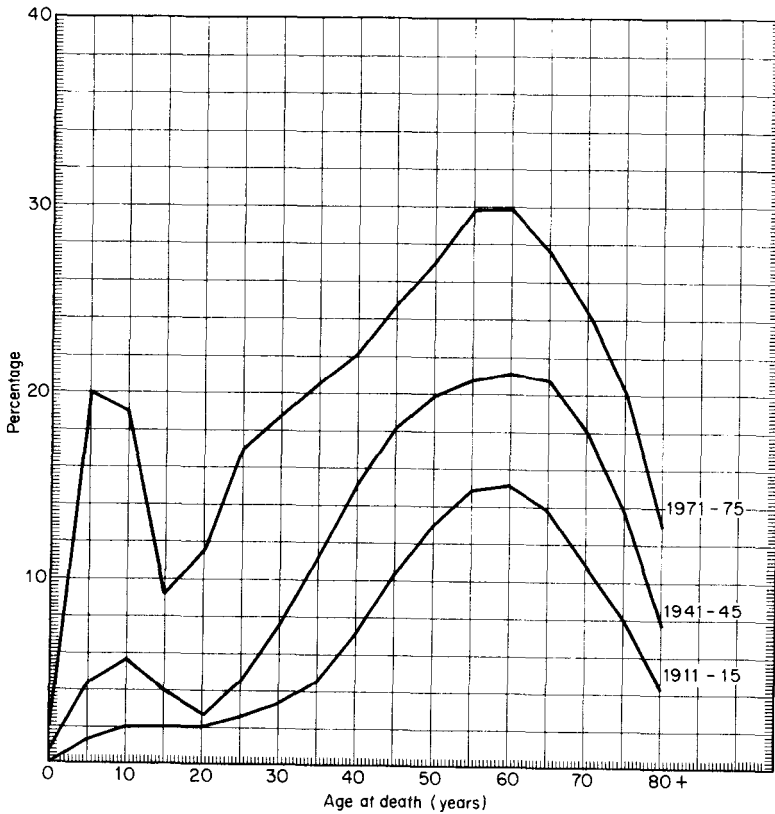
Fig. 2.3 All neoplasms: mortality rates for males by age at death in England and Wales, 1911-15, 1941-45, 1971-75.

### Trends by site of malignancy

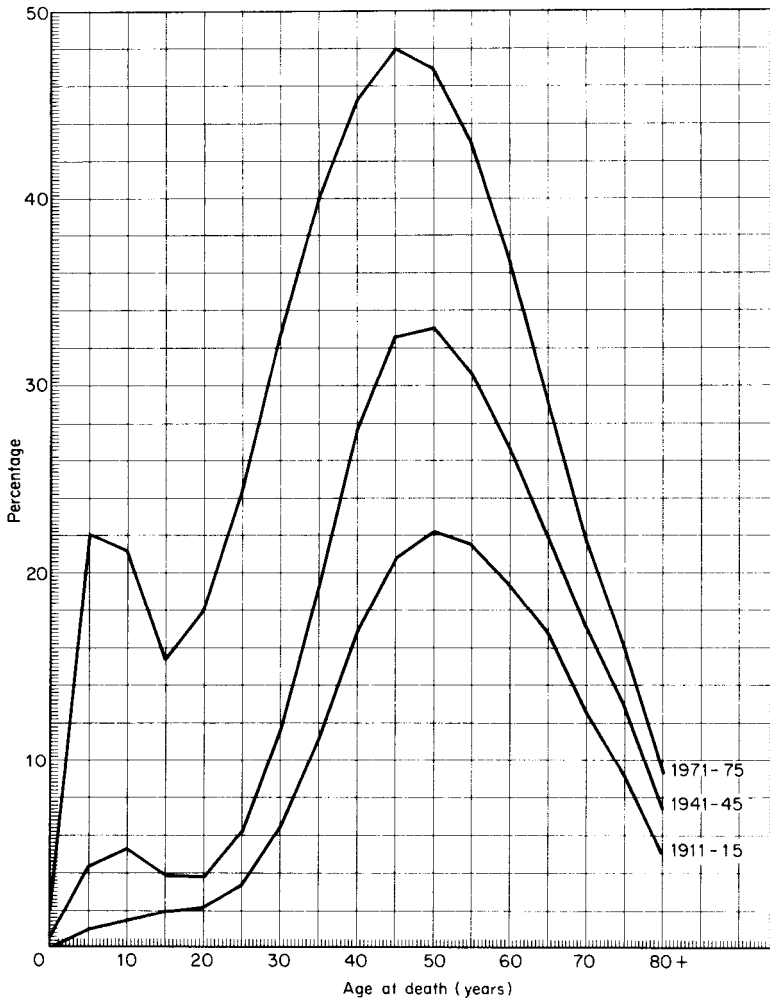
Pairs of graphs are now provided which cover the main groups of sites involved in malignancy. The number of specific sites on each graph varies, depending on the appropriate aggregation in the broad group. The pairs of graphs show the trends in mortality rate for males and then females for the major part of this century. For ease of presentation, the data for all these series of graphs are restricted to the age group 65-69; the rates are all presented on a three-cycle log scale, so that the slopes of the curves can be compared within one graph and also from one graph to another.



**Fig 2.4** All neoplasms: mortality rates for females by age at death in England and Wales, 1911-15, 1941-45, 1971-75.



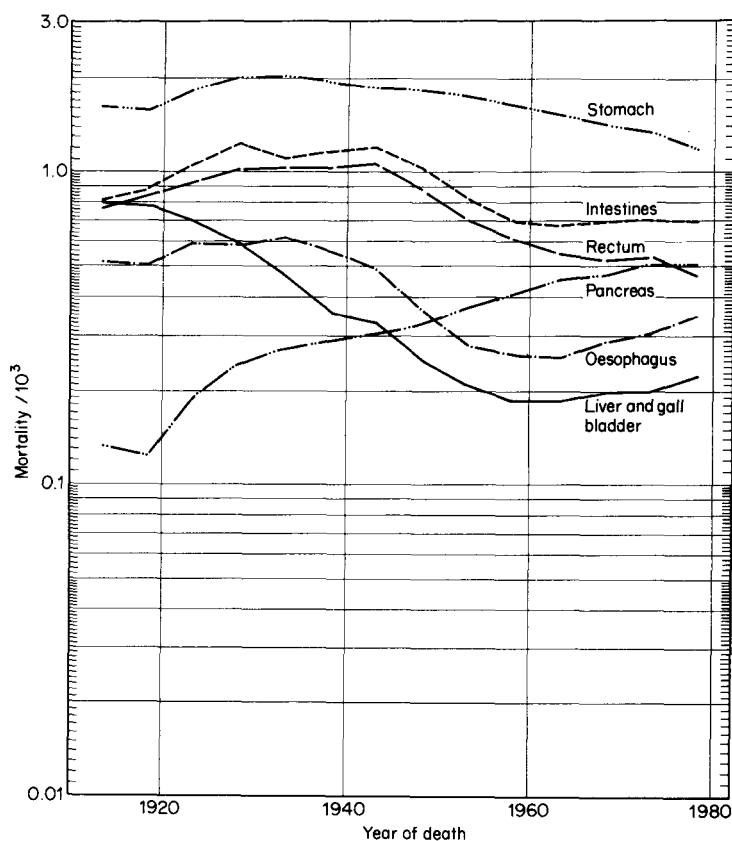
**Fig. 2.5** All neoplasms: deaths as a percentage of deaths from all causes for males by age at death in England and Wales, 1911-15, 1941-45, 1971-75.



**Fig. 2.6** All neoplasms: deaths as a percentage of deaths from all causes for females by age at death in England and Wales, 1911-15, 1941-45, 1971-75.

Figure 2.7 presents data for the alimentary tract for males. In general, the alterations in the rates have been similar for both sexes. Stomach, intestines and rectum all show a decline for both sexes, though there is a slight suggestion that this has slowed in the recent years, particularly for intestinal cancers. Very different is the curve for pancreas which shows an increase throughout the century for both sexes. Intermediate between these are the curves for oesophagus which show a degree of undulation, though the rates appear to be climbing for both sexes over the past thirty years. Similarly, the rates for liver and gall bladder have decreased throughout the major proportion of this century, but again show cessation of the fall or even a modest rise in the males.





**Fig. 2.7** Alimentary cancers: mortality rates for specific sites for males aged 65–69 years, England and Wales, 1911–78.

The next graph (Fig. 2.8) shows the trends for respiratory cancer for females. The overall picture is a horrifying rise in the lung cancer rates for both males and females. For males, the rates for larynx, pharynx, and mouth and tonsil showed a rise at the earlier part of the century and then a decline from about the early 1930s which appears to persist up until the latest date. For the females, the rates are slightly different, showing no appreciable increase or decrease throughout the century.

The next pair of graphs really require separate consideration as they show genito-urinary cancers for males and females. Figure 2.9 shows bladder, kidney and suprarenal, and two sex-specific cancers—prostates and testis. The testis curve (which is based on the lowest number of deaths) shows no appreciable trend in mortality rates throughout the century; however, this is an example where selection of one age group provides a very incomplete picture, as the trends in the younger age groups have shown an increase in testicular cancer. Prostate cancer appeared to show a rise at the earlier part of the century, but no appreciable change since the 1940s. Kidney and suprarenal and bladder cancer both show a